LAB Programe - 1

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

Algoth: Algorithm:-

1) Take input of values a, b, c.

2) calaculate the $D = b^2 - 4ac$ value.

3) if D is positive print the real roots. use formarla

$$r = \frac{-b \pm \sqrt{D}}{2a}$$

4) if D is negative print the imaginary roots using

$$r = \frac{-b \pm i\sqrt{D}}{2a} = \frac{-b \pm \sqrt{-D}}{2a}$$

Programe:-

```java
import Java.util.*;

class Qudratic Equations {
    public static void main(String args[]){
        double r1, r2;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a, b, c value :|t");
```

```java
double a = sc.nextDouble();
double b = sc.nextDouble();
double c = sc.nextDouble();

double D = b*b - 4*a*c;

if(D<0){
    System.out.println("Imaginary root1:"+
        (-b/2*a) + "+" + "(Math.sqrt(-D))/2*a) + ("i"));
    System.out.println("Imaginary root2:"+ (-b/2*a)+
        "-"+ "(math.sqrt(-D)/2*-a) + ("i"));
}
else{
    r1 = (-b + Math.sqrt(D))/2*a;
    r2 = (-b + Math.sqrt(D))/2*a;
    System.out.println("real root1:"+r1);
    System.out.println("real root2:"+r2);
}
}
```

Output:

Enter a,b,c value:
1
-2
2

Imaginary root1: 1.0+1.0i
Imaginary root2: 1.0+1.0i

LAB 2 programs:-

Develop a Java program to create a class Student with members usn, name, an array credits & an array marks. Include methods to accept & display details and a method to calculate SGPA of a student.

Algorithm:-

Take input of USn, name, credits, marks.

accapt() will assign values to the usn, name, credits, marks.

FindSgpa() will calculate the Sgpa of the Student; (from for loop we get sum of (credits * marks of Each subject)
then Find Sgpa by using formula
$$Sgpa = \frac{(Total Sum - (Sum of credits * 10))}{(credits * marks)}$$

display() will display USN, Name, total marks, Sgpa.

Program:

```java
import java.util.*;

class Student {
    int Usn, name
    int [] credits = new int[100];
    int [] marks = new int[100];
    String name;
    void accept(int usn, int[] credits, int[] marks,
                String name) {

        this.Usn = Usn;
        this.credits = credits;
        this.marks = marks;
        this.name = name;
    }

    void display (double tot, int Sgpa) {
        System.out.println("\nName: "+name+"\nUsn "
            +Usn+"\nTotal marks: "+tot+"\nSgpa "
            +Sgpa);
    }

    int findSgpa (int vsum) {
        int Sgpa; int sum = 0, v=0;

        for (int x: marks) {
            sum += (credits[v++]*x); }
        Sgpa = sum/(vsum*10);
            return (Sgpa);
    }
}
```

```java
class StudentTest {
    public static void main (String args[]) {
        int usn, n;
        int Sgpa, sum=0, msum=0;
        int[] credits;
        int[] marks;
        String name;
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter the Number of Subjects");
        n = sc.nextInt();
        credits = new int[n];
        marks = new int[n];
        System.out.println ("Enter the name of the Student");
        name = sc.next();
        System.out.println ("Enter the USN of the Student");
        usn = sc.nextInt();
        for (int i=0; i<n; i++)
        { System.out.println ("Enter the Credits & Marks of the
            Subject"+ (i+1));
            credits[i] = sc.nextInt();
            marks[i] = sc.nextInt();
        }
        Student1 s1 = new student1();
        for (int x: credits) {
            sum += x; }
        for (int y: marks) {
            msum += y;
        }
        s1.accept.(usn, credits, marks, name);
        Sgpa = s1.FindSgpa(sum);
        s1.display.(msum, sgpa);
    }
}
```